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SPECIAL PROJECT FOR RESEARCH TRAINING IN VOCATIONAL EDUCATION. FINAL REPORT.
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DESCRIPTORS- *EDUCATIONAL PROGRAMS, *VOCATIONAL EDUCATION, *STAFF IMPROVEMENT, *EDUCATIONAL RESEARCH, *RESEARCH METHODOLOGY, PROGRAM EVALUATION,

SPECIAL RESEARCH TRAINING WAS PROVIDED FOR 85 INDIVIDUALS IN FOUR, 2-DAY TRAINING PROGRAMS HELD AS PRESESSIONS TO THE 1967 AMERICAN VOCATIONAL ASSOCIATION CONVENTION. TWO-THIRDS OF THE PARTICIPANTS WERE VOCATIONAL-TECHNICAL AND RESEARCH PERSONNEL FROM COLLEGES AND UNIVERSITIES, AND THE REMAINDER WERE FROM RESEARCH COORDINATING UNITS, STATE DEPARTMENTS OF EDUCATION, RESEARCH DEVELOPMENT UNITS, AND PUBLIC SCHOOL SYSTEMS REPRESENTING 32 STATES. THE BROAD PURPOSE OF THE PROJECT WAS TO UPGRADE THE RESEARCH COMPETENCIES OF PARTICIPANTS BY FOCUSING UPON THE STATISTICAL TECHNIQUES AVAILABLE FOR APPLICATION TO CRITICAL, RESEARCHABLE PROBLEM AREAS IN VOCATIONAL AND PRACTICAL ARTS EDUCATION. THE MAJOR CONTENT TOPICS OF THE CONCURRENT PROGRAMS WERE--(1) APPLICATIONS OF REGRESSION MODELS TO PREDICTION PROBLEMS, (2) APPLICATIONS OF ANALYSIS OF VARIANCE TECHNIQUES TO EVALUATION PROBLEMS, (3) APPLICATIONS OF NONPARAMETRIC STATISTICS, AND (4) DEVELOPING DATA COLLECTION INSTRUMENTS. EACH PROGRAM HAD AN INSTRUCTIONAL TEAM CONSISTING OF A STATISTICAL SPECIALIST AND VOCATIONAL CONSULTANT. SUMMARIES OF 74 PARTICIPANT EVALUATION SHEETS INDICATED PROJECT SUCCESS IN OBTAINING THE OBJECTIVES. EXTENSIVE APPENDIXES INCLUDE A PROJECT NARRATIVE, A LIST OF PARTICIPANTS, THE EVALUATION SUMMARY, SUMMARIES OF THE FOUR PROGRAMS, AND A FORM FOR RECORDING PARTICIPANTS' PLANS FOR APPLYING SEMINAR OUTCOMES. (MM)

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SPECIAL PROJECT FOR RESEARCH TRAINING IN VOCATIONAL EDUCATION

FEBRUARY, 1968

U. S. DEPARTMENT OF
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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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SPECIAL PROJECT FOR RESEARCH TRAINING IN VOCATIONAL EDUCATION

Grant No. OEG-1-7-078451-4576

Neal E. Vivian
Program Director

December 2-3, 1967

The training program reported herein was conducted pursuant to a grant from the Office of Education, U. S. Department of Health, Education, and Welfare. Grantees undertaking such projects under government sponsorship are encouraged to express freely their professional judgment of the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION

The Ohio State University
Columbus, Ohio

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ORIENTATION OF PROGRAM

This special research training project provided training for eighty-five individuals in four, two-day training programs held concurrently as pre-sessions to the 1967 American Vocational Association Convention. Two thirds of the participants were vocational-technical and research personnel from colleges and universities and the remainder were from research coordinating units, state departments of education, research development units or agencies and public school systems. A summary of participation is provided below.

	University Personnel		St. Dept. of Ed.	Public Schools	Res. Coord. Units	Res. Dev. Units	Totals
PROGRAM	Research	Voc. Tech.					
A	2	10	1	1	0	1	15
B	1	10	0	1	3	2	17
C	3	12	1	0	3	0	19
D	3	17	2	4	4	4	34
Totals	9	49	4	6	10	7	85

Positions held by the participants included:

Coordinator of Surveys and Evaluation
Supervisor of Research for Research Coordination Unit
Coordinator for Development and Training (2)
Director of Research (Univ. St. Dept. of Ed. - 2)
Assistant Director of Occupational Research Unit
Director of Research Coordinating Units (10)
Statistical Analyst
Director of Educational Resources Center
Specialist in Testing and Research (Univ.)
Director of Management Institute (Univ.)
Director of Center for Instructional Materials (2)
Research Specialist
Coordinator of Continuing Research and Education

The instructional phase of the program was carried out in Cleveland, Ohio on December 2-3, 1967, just prior to the meeting of the American Vocational Association in the same city.

The broad purpose of the proposed special training program was to upgrade the research competencies of participants by focusing upon the statistical techniques available for application to critical, researchable problem areas in vocational and practical arts education.

The specific objectives for all four programs were to develop in the trainees:

1. Familiarity with selected statistical techniques, their basic logic, procedures, limitations and assumptions.

2. Recognition of the relevancy and design applications of those techniques to certain types of vocational and practical arts problems.

3. An awareness of the effects of data characteristics upon analysis techniques.

4. The skill to conceptualize the relationships among problem variables for statistical design purposes.

5. The ability to utilize effectively the consultive services of statistical experts.

DESCRIPTION OF THE PROGRAM

The training programs began at 8:30 a.m. Saturday, December 2, 1967 and closed at 5:00 p.m. on Sunday, December 3, 1967 for a total of fourteen hours of instruction.

The major content topics covered during the two-day period by each of the concurrent programs, with approximate time allocations, were as follows:

Program A - "Applications of Regression Models to Prediction Problems in Vocational and Practical Arts Education."

(a)	Review of general bivariate regression	3.5 hrs.
(b)	Multiple regression	3.5 hrs.
(c)	Canonical correlation	3.5 hrs.
(d)	Discriminant analysis	3.5 hrs.

Program B - "Applications of Analysis of Variance Techniques to Evaluation Problems in Vocational and Practical Arts Education."

(a)	Normal and F sampling distributions and tests of means and variances	3.5 hrs.
(b)	One-way ANOVA	1.0 hrs.
(c)	Two-way ANOVA	1.5 hrs.
(d)	Contrasts (Orthogonal, Scheffé, etc.)	1.0 hrs.
(e)	Nested and cross design	2.0 hrs.
(f)	Three-way ANOVA	1.5 hrs.
(g)	Covariance	3.5 hrs.

Program C - "Applications of Non-parametric Statistics to Vocational and Practical Arts Problems."

(a)	One-sample cases	3.5 hrs.
(b)	Two-sample cases for related and independent samples	3.5 hrs.
(c)	Multi-sample cases for related and independent samples	3.5 hrs.
(d)	Non-parametric measures of correlation	3.5 hrs.

Program D - "Developing Data Collection Instruments."

(a)	Levels for measurement and scaling techniques	3.5 hrs.
(b)	Factors influencing and types of validity and reliability	3.5 hrs.
(c)	Procedures for measuring validity and reliability	7.0 hrs.

Staff:

Neal E. Vivian of The Center for Vocational and Technical Education, The Ohio State University, acted as Project Director and Jerome Moss, Professor of Industrial Education, The University of Minnesota, the Instructional Coordinator. Virgil E. Christensen, original Project Director, was a special consultant to the project staff. Kenneth E. Hoffman, Research Associate to The Center, also served on the administrative staff and assisted in the project operation.

The instructional team for each program included a Statistical Specialist and a Vocational Consultant. The vocational consultant insured that the utility of the statistical content for vocational and practical arts education problems was made clear.

The instructional teams for the four programs were:

Program A - James S. Terwiliger, University of Minnesota, (Statistical Specialist), and

David J. Pucel, University of Minnesota, (Vocational Consultant)

Program B - Gene V. Glass, University of Colorado, (Statistical Specialist), and

Douglas Sjogren, Colorado State University, (Vocational Consultant)

Program C - Leonard Marascuilo, University of California, Berkeley (Statistical Specialist), and

Everett Edington, Director, Research Coordinating Unit, Sacramento (Vocational Consultant)

Program D - J. Thomas Hastings, University of Illinois
(Statistical Specialist), and

Lloyd Phipps, University of Illinois
(Vocational Consultant)

EVALUATION OF THE PROGRAM

Seventy-four of the eighty-five participants completed useable evaluation sheets at the termination of the training program. The summaries of these evaluations are included in the Appendix of this Final Report. Upon the basis of the participant's evaluation and the observations of the training program staff the following program assessment is made.

1. Program Factors

a. Objectives

The general objectives of the Research Training Program (Page 2) and the objectives appropriate to each of the four separate sessions (Appendix E) were evaluated by the participants. The Kolmogorov-Smirnov one sample test was used to determine the degree of agreement between the distribution of the responses on the five point scale and a theoretical equal distribution among the five options.

The Kolmogorov-Smirnov one-sample test is a test of goodness of fit.[1] That is, it is concerned with the degree of agreement between the distribution of a set of observed scores (or choices) and some specified theoretical distribution. It is concerned with whether the scores (or choices) of a population differ from the expected distribution of choices. The distribution selected for comparison with the distribution of participant's choices was the equal distribution.

Briefly, the test involves specifying the cumulative frequency distribution which would occur under the theoretical or expected distribution (20% in each cell), and comparing that with what is observed as the actual distribution of choices. The theoretical or expected distribution represents what would be expected under the null hypothesis. The point at which these two distributions, the expected and the observed, show the greatest difference within a particular cell is determined. Reference to the sampling distribution indicates whether such a difference is likely on the basis of chance. Within a five position scale ranging from negative to positive, the difference can be described as negative or positive depending upon the cell within which the greatest difference is determined.

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[1] Sidney Siegel, Non-Parametric Statistics, (New York: McGraw-Hill Book Company, 1956) p.47.

Fifty-nine of seventy-one participants (83%) rated the program from moderately to maximally successful in accomplishing the objective of familiarity with statistical techniques, their basic logic, procedures, limitations and assumptions (Objective No. 1). Three persons (4%) rated the program as being completely unsuccessful in achieving this objective. The participant's preference for choosing the successful categories differed from the expected distribution at the .001 level of significance.

Fifty-six of seventy-one persons (78%) preferred the categories moderately successful to maximally successful in rating the success of the training program in helping them recognize the relevancy and design applications of those techniques to certain types of vocational and practical arts problems (Objective No. 2). Only two persons (3%) felt the program was completely unsuccessful in achieving this objective. Objective two differed from the expected distribution at the .05 level of significance.

Sixty-three of seventy-one participants (88%) said the program had been successful in helping them develop an awareness of the effects of data characteristics upon analysis techniques (Objective No. 3). Only eight persons (11%) chose the minimally successful or completely unsuccessful categories. The participant's responses differed from the expected distribution at the .001 level of significance.

Thirty-four (47%) said they felt the program had been at least very successful in assisting them develop the skill to conceptualize the relationships among problem variables for statistical design purposes. Eight persons (11%) stated the program had been either minimally successful or completely unsuccessful in helping them achieve this objective. The fourth objective, as compared to the expected distribution, was judged successful at the .001 level of significance.

The choices of the participants on objective five (The ability to utilize effectively the consultative services of statistical experts) differed from the chance distribution at the .01 level of significance. Thirty-eight of sixty-nine (55%) rated the program as very successful in helping them achieve this objective, whereas eleven (16%) felt the program was only minimally successful and three (4%) felt it was completely unsuccessful. This objective was judged successful by the participants at the .01 level of significance when compared to the expected distribution.

b. Content

The trainees apparently were satisfied with the content of the training program. Items ten and eleven on the participant's evaluation pertain to the content of the program. Fifty-four of seventy-four trainees (73%) felt that the program was well related to their needs. Fourteen (19%) said the program content was adequate but could have been better. Six (8%) stated the content was only slightly related to their needs. None of the participants chose the category of complete unrelatedness to their needs.

Twenty-eight of seventy-four trainees (38%) stated the content level was just about right. Thirty (40%) stated the content was high, but acceptable and eleven (15%) checked that the content was low but acceptable. Only five (7%) thought the content was either too far above or entirely too low for their needs. A detailed evaluation on the content of the four programs is presented in Appendix E of this Final Report.

Eighty-four percent (62 out of 74) of the trainees responded that the program was helpful or of great value in increasing their job competencies. Only two persons (3%) checked the response indicating that the program was of little value in increasing their job competencies. None of the respondents indicated that the program was of no value in contributing to their job competence.

c. Staff

The staff was evaluated in terms of a general evaluation of instruction (Item 13) and in terms of the adequacy of texts or other printed instructional materials used by the instructional staff (Item 14). Ninety-three percent of the seventy-four participants who responded to Item 13 judged the instruction as from good to excellent. Only one participant checked the inadequate category in this item. Eighty-nine percent of the trainees rated the texts or other instructional materials as from good to excellent. Only two persons checked these instructional materials as being inadequate. The responses to both these items when analyzed by the Kolmogorov-Smirnov one-sample test of the goodness of fit varied from what would be expected by chance at the .001 level of significance.

d. Trainees

All of the participants were involved in some phase of vocational education research. This common background of interest and experience on the part of the trainees was a contributing factor to the success of the program as it enabled the instructors to focus the learning activities on topics of mutual concern to all of the participants. However there was great variation in the amount of formal preparation in statistics among the students. This created a problem in determining a level of the instruction which was challenging to some of the students but not too advanced for others.

The participants were well distributed geographically with 32 states represented in the enrollment.

e. Organization

Seventy-two of seventy-three participants (98%) who completed this item said that the program was adequately organized. Of this number eighty-five percent rated the program as being well organized, forty percent of the total had rated the program as having excellent organization developed in a meaningful sequence. Only one person felt the program was inadequately organized.

Although no analysis was made of the response to program length because of the categories used, fifty-eight (79%) of the persons thought the length was acceptable for the purposes of the training program. Thirteen (18%) thought the program was too short to cover the content.

f. Budget

The budget was sufficient to accomplish the objectives of the seminar and the seminar was operated well within the budgeting limits.

2. Major Strengths

a. Team Teaching

The greatest strength of the program was the team approach used in the instruction. The instructional team for each program included a Statistical Specialist and a Vocational Consultant. Each of the four statisticians were recognized experts in the specific area of his program. In every case the statistician did an excellent job in the areas such as: familiarizing the students with the statistical techniques including the rationale, limitations, and assumptions; and developing skills in recognizing the relationships among problem areas for statistical design purposes.

The vocational consultant in each program served in a supportive role to the Statistical Specialist. He helped to relate the utility and applicability of the statistical content to research activities in vocational education. The vocational education consultant also helped the participants to recognize the relevancy and design applications of those techniques to certain types of vocational education problems.

By utilizing the services of two instructors in each class the students were exposed to both the theory and the vocational relevancy of the statistical techniques being considered.

b. Small class size

Because classes were relatively small it was possible for the instructors to give individual attention to participants--particularly those who had specific problems and who were able to take advantage of the expert advice available. This also provided for increased classroom interaction.

c. Availability of Ancillary Services

Another strength of the program was the services available for instructional purpose. In addition to overhead projectors, opaque projectors, screens, flip charts and chalkboards; typewriters, reproduction and duplication facilities were available and used. Thus, items such as data gathering instruments developed in the classes were made available for immediate distribution to all of the participants.

d. Continuing and Concurrent Evaluation

Because of the four staff meetings held during the seminars, continuing evaluation of the program was possible. This immediate feedback enabled the administrative staff to make any necessary adjustments in the program, based on observations and assessments made by the instructors, and generally to keep their fingers on the pulse of the program operation. Also this concurrent evaluation provided the administrative staff with valuable suggestions for future programs.

e. Homogeneity of Interest

All of the participants enrolled in the seminar were involved in vocational education. This common background enabled the instructors to focus directly on topics of interest to all of the participants. The instructors and participants alike felt that the instruction was thus more meaningful and realistic to all those in attendance.

3. Major Weaknesses

a. Divergence in previous statistical training.

In the announcements, careful efforts were made to describe accurately the content of each of the programs and the type and amount of previous statistical training recommended. Nevertheless there was a wide divergence in the statistical ability of the participants. In some of the programs the instructor felt that the material was too advanced for some students while for others the instruction did not proceed rapidly enough. Two steps will be taken to solve this problem in future programs (1) screening procedures will be tightened and (2) all of the participants will be given a pre-test and the classes divided into ability groups for at least part of the sessions, based on the results of this pre-test.

b. Content in relation to time allotment.

Almost half of the participants felt that the program was too short to accomplish the intended objectives. Some commented that length of the program did not permit adequate treatment of some of the topics covered. Perhaps, in the future the number of topics should be reduced to permit in-depth treatment of those topics covered.

4. Overall Evaluation

An overall evaluation of the program indicates that this series of training programs accomplished its major purpose; that is, to upgrade the research competencies of the participants by focusing upon the statistical techniques available for application to critical, researchable problem areas in vocational and practical arts education.

The following is a summary of the responses made by the participants on the evaluation forms:

I. Program Evaluation - CONGRUENCE BETWEEN PROGRAM AND STATED OBJECTIVES

The objectives for all four programs are stated below. After each objective please indicate how successful the program was in accomplishing the stated objectives.

1. Familiarity with statistical techniques, their basic logic, procedures, limitations and assumptions.

__8__ Maximally successful

__33__ Very successful

18 Moderately successful

9 Minimally successful

3 Completely unsuccessful

2. Recognition of the relevancy and design applications of those techniques to certain types of vocational and practical arts problems.

9 Maximally successful

23 Very successful

24 Moderately successful

13 Minimally successful

2 Completely unsuccessful

3. An awareness of the effects of data characteristics upon analysis techniques.

13 Maximally successful

31 Very successful

19 Moderately successful

6 Minimally successful

2 Completely unsuccessful

4. The skill to conceptualize the relationships among problem variables for statistical design purposes.

11 Maximally successful

23 Very successful

26 Moderately successful

6 Minimally successful

2 Completely unsuccessful

5. The ability to utilize effectively the consultive services of statistical experts.

17 Maximally successful

21 Very successful

17 Moderately successful

11 Minimally successful

3 Completely unsuccessful

6. ORGANIZATION OF THE PROGRAM.

29 Excellent organization in meaningful sequence

33 Well organized

10 Adequate, but could be better

1 Inadequate organization

_____ Confused and unsystematic

7. PROGRAM LENGTH.

17 Program length was just right

15 Program was long, but acceptable

26 Program was short, but acceptable

_____ Program was much too long

13 Program was too short to cover the content

8. DEGREE TO WHICH PROGRAM OUTCOMES MET MY PRIOR EXPECTATIONS.

12 Program exceeded my prior expectations

35 My prior expectations were well met

19 Program was adequate in terms of prior expectations but could have been better

8 Program was barely adequate in this respect

_____ Program completely failed to meet my expectations

9. HOW REALISTIC AND ATTAINABLE WERE THE OBJECTIVES AND OUTCOMES OF THE SEMINAR?

9 Very realistic and easily attainable

35 Capable of being accomplished by most participants

16 Adequate, or average

13 Lacking in realism considering time involved and type of participants

_____ Completely unrealistic

10. APPLICABILITY OF CONTENT TO NEEDS.

27 Content was exceptionally well related to my needs

27 Content was moderately well related to my needs

14 Content was adequate - could be better

6 Content was only slightly related to my needs

_____ Content was completely unrelated to my needs

11. LEVEL OF CONTENT.

28 Content level was just about right

30 High, but acceptable

11 Low, but acceptable

3 Content was far above level needed for my work

2 Level was entirely too low

12. OPPORTUNITY FOR QUESTIONS AND DISCUSSION.

55 Ample opportunity

13 Moderate opportunity

6 Occasional opportunity

_____ Rare opportunity

_____ Never

13. GENERAL EVALUATION OF INSTRUCTION.

42 Outstanding

27 Good

4 Satisfactory

1 Inadequate

_____ Poor

14. TEXTS OR OTHER PRINTED INSTRUCTIONAL MATERIALS.

39 Texts and materials excellent

27 Good

6 Adequate, but could be better

2 Text and materials need modification

_____ Text and materials entirely inappropriate

15. CONTRIBUTION OF PROGRAM TO INCREASED JOB COMPETENCIES.

23 Program will be of great value in increasing job competencies

39 Program will be helpful

10 Program will be of moderate value only

2 Program will be of little value

_____ Program will be valueless

16. MEETING ROOMS OR ACCOMMODATIONS.

14 Excellent

44 Good

11 Barely adequate

3 Poor

_____ Completely inadequate

17. EVALUATION OF THE SPECIFIC MAJOR TOPICS.

Please indicate how valuable the treatment of each of the major topics in your program only was to you.

Program A - Regression Models	Maximum Value	High Value	Moderate Value	Limited Value	No Value
(a) Review of general bivariate regression	4	2	4	3	
(b) Multiple regression	4	3	5	1	
(c) Canonical correlation	3	1	5	4	
(d) Discriminant analysis	5	3	4	1	
Program B - Analysis of Variance					
(a) Normal and F sampling distributions and tests of means and variances	4	6	4	1	
(b) One-way ANOVA	6	5	2	1	
(c) Two-way ANOVA		3	1	3	
(d) Contrasts (Orthogonal, Scheffé, etc.)		1	1	4	1
(e) Nested and cross design		1	2	1	1
(f) Three-way ANOVA		1	1	1	1
(g) Covariance	1	2	4		1
Program C - Non-Parametric Statistics					
(a) One-sample cases	8	6	3		
(b) Two-sample cases for related and independent samples	9	6	1	1	
(c) Multi-sample cases for related and independent samples	7	5	2	2	
(d) Non-parametric measures of correlation	8	5	2	1	

	Maximum Value	High Value	Moderate Value	Limited Value	No Value
Program D - Data Collection Instruments					
(a) Levels for measurement and scaling techniques	3	7	9	2	1
(b) Factors influencing and types of validity and reliability	3	16	7	1	
(c) Procedures for measuring validity and reliability	3	12	8	3	1

Would you recommend that The Center continue to sponsor Research Training Seminars? 69 Yes ____ No

Would you recommend that they be offered just prior to the A.V.A. Convention as they were this year? 65 Yes 2 No

What other times do you feel would be appropriate?

1. Planned sessions in regions
2. After the A.V.A. Convention
3. As part of the RCU Director's Conference
4. Summer or Christmas recess
5. Should be longer (1 week)

In addition, the participants reported many ways in which the program was specifically helpful to them and indicated specific examples of how they plan to utilize the skills and knowledges developed in this program in their future activities. The plans of forty-four participants for using the skills and knowledges developed in this program can be summarized into six broad categories as follows:

The Use to Which Research Skills and Knowledges will be put.	Number of Participants
Application to present ongoing research efforts	5
Utilization in future research plans	12
Working with graduate students in research	5
Professional growth and development	12
Teaching	4
Specific competency development	6

5. Recommendations

In light of the satisfactory relationships with the U. S. Office of Education there are no recommendations or suggestions in the administration of the program. The investigators received full cooperation from all of the resource people and administration in the Office of Education.

PROGRAM REPORTS

Publicity

An announcement of the special AVA Pre-Session Program for Researchers was made in the September, 1967 issue of the CENTERGRAM, a publication of The Center for Vocational and Technical Education. This issue was distributed to the general mailing list of The Center which includes state directors of vocational education, state supervisors of all vocational service areas, directors of research coordination units within the states and teacher educators of all vocational services in all the states and territories. In addition this publication is sent to all the directors of vocational education in cities with more than 50,000 population. Subsequent announcements of the dates and nature of the Pre-Session were also made in the October and November issues of the CENTERGRAM.

This general mailing to more than nineteen hundred persons in the groups described above was repeated on October 23, 1967. A description of the program, two application blanks and an accommodations and rate form was sent to each of the vocational-technical educators mentioned above. On November 10, 1967 a second mailing was made to Research Coordination Unit directors and to state supervisors of Industrial Arts Education which also included the information concerning the program and additional application blanks. Copies of these announcements and application forms are included in Appendix B of this Final Report.

In addition, an announcement of the seminar together with a description of the program appeared in the October, 1967 issue of the American Vocational Journal.

Application Summary

a.	Approximate number of inquiries from prospective trainees (letter or conversation)	100
b.	Number of completed applications received	93
c.	Number of first rank applications (Applicants who are well-qualified whether or not they were offered admission)	93
d.	How many applicants were offered admission	All

Trainee Summary

a.		Number of trainees initially accepted in program	93
		Number of trainees enrolled at the beginning of program	85
		Number of trainees who completed program	85
b.		Categorization of trainees	
	(1)	Number of trainees who principally are elementary or secondary public school teachers	0
	(2)	Number of trainees who are principally local public school administrators or supervisors	6
	(3)	Number of trainees from State education groups	11
	(4)	Number of trainees from colleges or universities, junior colleges, research bureaus, etc. (specify)	
		Research Coord. Unit Directors	10
		University or College Personnel - Research	9
		Vocational-Technical	49

Program Director's Attendance

a.	What was the number of instructional days for the program?	2 days (14 hours)
b.	What was the percent of days the director was present?	100%

Financial Summary--Note: This summary does not serve as a final financial report so amounts need not be exact.)

			Budgeted	Expended or Committed
a.		Trainee Support		
	(1)	Stipends	-0-	-0-
	(2)	Dependency allowance	-0-	-0-
	(3)	Travel	-0-	-0-

Financial Summary - continued

		Budgeted	Expended or Committed
b.	Direct Costs		
	(1) Personnel	$3,310.00	$2,904.10
	(2) Supplies	525.00	495.62
	(3) Equipment	65.00	-0-
	(4) Travel	2,060.00	2,061.80
	(5) Other	118.20	40.44
c.	Indirect Costs	486.26	440.16
		$6,564.46	$5,942.12

APPENDIX A

NARRATIVE

NARRATIVE

1. Type of Training Program

This proposal requests funds for the partial support of four, two-day special research training programs to be held concurrently as pre-sessions to the 1967 American Vocational Association Convention (Cleveland, Ohio). A maximum of one hundred twenty persons are to be served by the four programs.

2. Significance of the Training Program to Education

Because of the nature of his training and experience, the typical vocational and practical arts educator who is presently interested in conducting research has inadequate knowledge about the statistical tools available to him. This is a serious deficiency. It either delimits the kinds of studies he is willing to pursue, or it leads to naive, oversimplified approaches to complex educational problems. This inadequacy may even be an important influence upon developing unwarranted optimism or pessimism about the value of research in vocational and practical arts education.

It is not feasible or essential, in most cases, to develop competencies in the computational procedures associated with advanced statistical techniques. What is immediately necessary, however, is that more vocational educators become acquainted with some of the advanced statistical tools and recognize their relevance to different kinds of vocational and practical arts education problems so that research design applications become apparent and research horizons are broadened.

The fact that this deficiency exists, that it is extremely debilitating, and that the proposed two-day training programs are an effective and efficient way to help alleviate the situation is fully endorsed by the members of the American Vocational Association Research Committee.

Several advantages accrue by providing the necessary training during pre-sessions of the AVA Convention. First, the timing is advantageous in that most of the primary target group of educators ordinarily attend the Convention. Second, it is economical in that it minimizes the cost to individuals who would normally attend the Convention, and provides an incentive for others to do so. Third, instruction in statistical tools will be immediately followed (for those who attend the Convention) by many opportunities to relate them to the substantive vocational education problems and studies discussed at convention research meetings. The American Vocational Association wholeheartedly supports the proposed pre-session training programs and has offered full cooperation in their conduct.

3. Objectives of the Training Program

The broad purpose of the proposed special training program is to upgrade the research competencies of participants by focusing upon the statistical techniques available for application to critical, researchable problem areas in vocational and practical arts education.

The specific objectives, for all four programs, are to develop in the trainee:

(1) Familiarity with selected statistical techniques, their basic logic, procedures, limitations and assumptions.

(2) Recognition of the relevancy and design applications of those techniques to certain types of vocational and practical arts problems.

(3) An awareness of the effects of data characteristics upon analysis techniques.

(4) The skill to conceptualize the relationships among problem variables for statistical design purposes.

(5) The ability to utilize effectively the consultive services of statistical experts.

4. Number and Selection of Participants

The total number of trainees to be involved in the training project, one-hundred twenty, represents a conservative estimate, based upon the number of applicants to previous research training efforts, of the persons who will desire and qualify for the proposed programs. The number of trainees per program will be limited to thirty to promote effective classroom interaction and to insure the availability of appropriate size hotel meeting rooms.

In order to cover the proposed content adequately and attain the objectives set forth, above, it will be necessary to establish one graduate level course in statistics as the minimum eligibility criterion for participants in all programs.

Among those who meet this eligibility requirement, preference will be given to those who:

(1) Have research responsibilities and/or opportunities.

(2) Are employed in vocational and practical arts education positions.

(3) Have conducted or are conducting research in vocational and practical arts education.

(4) Have completed two to four graduate courses in statistics.

The programs will be publicized by means of announcements in appropriate professional publications, e.g. AV Journal, Educational Researcher, etc., and by direct mailings to state superintendents and/or directors of vocational education, and to the state research coordination units for publication in their newsletters. Formal applications and program descriptions will be mailed upon receipt of inquiries. Each applicant will be asked to furnish information pertaining to the above selection criteria, as well as his preferences among the four programs.

On the basis of information supplied by the applicant, the AVA Research Committee will recommend participants to the Project Director.

5. Educational Research Training Capability

The Center for Vocational-Technical Education at The Ohio State University with a staff of over 20 professional educators has demonstrated its capacity and effectiveness for planning, organizing and "following-through" on projects of the scope proposed. Center staff members have conducted more than a score of national seminars, institutes, workshops and research training programs over the past 20 months, involving several hundred educational leaders from all fifty states and the territories of Guam, Puerto Rico, and the Virgin Islands. In addition, 185 institutions of higher learning have had representatives participate in Center sponsored activities.

The AVA Research Committee, by virtue of its previous co-sponsorship of research training programs over the past five years, has a history of experience for ascertaining the research needs of vocational and practical arts educators, and in the most effective criteria for selecting participants with the greatest potential for profiting from the proposed programs.

A significant aspect in the timing and setting of this project is the potential for involvement by trainees in the research meetings of the annual convention of the American Vocational Association. This advantage has also been recognized by Mr. Lowell Burkett, Executive Director, AVA, who has encouraged the development and submission of this proposal.

6. Program Outline

The training programs will begin at 8:30 a.m., Saturday, December 2, 1967 and close at 5:00 p.m. on Sunday, December 3, 1967 for a total of fourteen hours of instruction.

The major content topics to be covered during the two-day period by each of the concurrent programs, with approximate time allocations,* are as follows:

Program A - "Applications of Regression Models to Prediction Problems in Vocational and Practical Arts Education."

(a)	Review of general bivariate regression	3.5 hrs.
(b)	Multiple regression	3.5 hrs.
(c)	Canonical correlation	3.5 hrs.
(d)	Discriminant analysis	3.5 hrs.

Program B - "Applications of Analysis of Variance Techniques to Evaluation Problems in Vocational and Practical Arts Education."

(a)	Normal and F sampling distributions and tests of means and variances	3.5 hrs.
(b)	One-way ANOVA	1.0 hrs.
(c)	Two-way ANOVA	1.5 hrs.
(d)	Contrasts (Orthogonal, Scheffé, etc.)	1.0 hrs.
(e)	Nested and cross design	2.0 hrs.
(f)	Three-way ANOVA	1.5 hrs.
(g)	Covariance	3.5 hrs.

Program C - "Applications of Non-parametric Statistics to Vocational and Practical Arts Problems."

(a)	One-sample cases	3.5 hrs.
(b)	Two-sample cases for related and independent samples	3.5 hrs.
(c)	Multi-sample cases for related and independent samples	3.5 hrs.
(d)	Non-parametric measures of correlation	3.5 hrs.

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* Estimated time allocations may be revised when the instructional personnel finalize the selection of detailed content.

Program D - "Developing Data Collection Instruments."

(a) Levels for measurement and scaling techniques..................................3.5 hrs.
(b) Factors influencing and types of validity and reliability........................3.5 hrs.
(c) Procedures for measuring validity and realiability..................................7.0 hrs.

The basic method of instruction will be illustrated lectures by an expert in each of the four statistical areas described by the programs above. Each presenter will be requested to approach the statistical content using appropriate, realistic vocational and practical arts education problems as vehicles. In addition, each presenter will prepare, in advance of the meeting, written instructional materials containing lecture outlines, procedural steps, formulae, etc. to serve as supplements to the oral presentations. Each handout will cover a maximum of one-half day's content; it will be distributed at the beginning of the relevant presentation, and will serve as review and reference materials for future use by the participants. A formal assessment of trainee achievement will be made at the close of the first day's session to provide feedback to the instructor; if indicated, appropriate adjustments in plans for the second day can then be made.

A competent vocational education researcher in attendance at all sessions of each program will serve in a supportive role to the statistical specialist to insure that the utility of the statistical content to vocational and practical arts education problems is made clear.

The statistical expert and his vocational educator counterpart will be selected from the same institution or geographic area. This will facilitate joint pre-planning and preparation of instructional materials, and help make certain that the content has maximum relevance to current, typical problems. The budget reflects this pre-planning provision.

Many individuals can be identified who have served very effectively in prior research training efforts of a similar nature. Some of these people are now located at institutions where there are also vocational educators who are recognized for their research competence. The following are examples of the type of instructional teams which will be formed:

Program A - James S. Terwiliger, University of Minnesota,
(Statistical specialist), and

David J. Pucel, University of Minnesota,
(Vocational consultant)

Program B - Gene V. Glass, University of Colorado,
(Statistical specialist), and

Douglas Sjogren, Colorado State University,
(Vocational consultant)

Program C - Leonard Marascuilo, University of California,
Berkeley (Statistical specialist), and

Everett Edington, Director, Research Coordinating
Unit, Sacramento (Vocational consultant)

Program D - J. Thomas Hastings, University of Illinois,
(Statistical specialist), and

Lloyd Phipps, University of Illinois,
(Vocational consultant)

Two approaches will be used to evaluate the effectiveness of each program. First, trainees will be asked to indicate a) the extent of their progress toward the stated goals of the program, b) the degree of congruence between their prior expectations and program objectives, c) the appropriateness of content, in light of program objectives, and the effectiveness of instruction, and d) suggestions for the content of future training programs. Second, a test will be administered to assess student achievement upon completion of the program.

7. Facilities

The training program will use the housing and conference facilities of the Pick-Carter Hotel, Cleveland, Ohio. Preliminary inquiries indicate that four adequate meeting rooms and a conference center will be available December 2-3, 1967.

Each meeting room will be equipped with blackboard(s) and an overhead projector, obtained from the hotel or through local public school authorities. Duplicating equipment and services will be provided to the training programs by AVA Convention Headquarters. Office equipment, e.g. calculator, typewriter, etc. will be rented for secretarial and instructor use.

Each instructor will be responsible for deciding upon the need for specific texts and other reference materials. Where these are required, participants will be notified in advance and will be expected to supply their own copies.

8. Other Related Support

None.

APPENDIX B

LIST OF PARTICIPANTS BY PROGRAM

AVA PRESESSION RESEARCH TRAINING PROGRAM
December 2-3
Cleveland, Ohio

Participants in Program A

Dr. Paul Vaughn Braden
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Oklahoma State University
Stillwater, Oklahoma

Dr. J. Joseph Doerr
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Mr. Daniel Wade Johnston
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Participants in Program A - continued

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APPENDIX C

PUBLICITY AND ANNOUNCEMENT LETTERS

A.V.A. PRESESSION RESEARCH TRAINING PROGRAM
Cleveland, Ohio
December 2-3, 1967

The Center for Vocational and Technical Education in cooperation with the American Vocational Association is conducting four two-day special Research Training Programs to be held concurrently as Presessions to the A.V.A. Convention in Cleveland, Ohio, December 2 and 3, 1967. This is a U. S. O. E. sponsored training program.

Time and Location of Program. All of the four programs will be held on December 2 and 3 at the Pick-Carter Hotel, 1012 Prospect Avenue. Seminar Headquarters will be at the South Georgian Room.

Objectives of the Training Program

The broad purpose of the proposed special training program is to upgrade the research competencies of participants by focusing upon the statistical techniques available for application to critical, researchable problem areas in vocational and practical arts education.

The specific objectives, for all four programs, are to develop in the trainee:

1. Familiarity with selected statistical techniques, their basic logic, procedures, limitations and assumptions.
2. Recognition of the relevancy and design applications of those techniques to certain types of vocational and practical arts problems.
3. An awareness of the effects of data characteristics upon analysis techniques.
4. The skill to conceptualize the relationships among problem variables for statistical design purposes.
5. The ability to utilize effectively the consultive services of statistical experts.

Program Outline

The training programs will begin at 8:30, Saturday, December 2, 1967 and close at 5:00 p.m. on Sunday, December 3, 1967 for a total of fourteen hours of instruction.

The major content topics to be covered during the two-day period by each of the concurrent programs, with approximate time allocations, are as follows:

Program A - "Applications of Regression Models to Prediction Programs in Vocational and Practical Arts Education."

(a) Review of general bivariate regression	3.5 hrs.
(b) Multiple regression	3.5 hrs.
(c) Canonical correlation	3.5 hrs.
(d) Discriminant analysis	3.5 hrs.

Program B - "Applications of Analysis of Variance Techniques to Evaluation Problems in Vocational and Practical Arts Education."

(a) Normal and F sampling distributions and tests of means and variances	3.5 hrs.
(b) One-way ANOVA	1.0 hrs.
(c) Two-way ANOVA	1.5 hrs.
(d) Contrasts (Orthogonal, Scheffé, etc.)	1.0 hrs.
(e) Nested and cross design	2.0 hrs.
(f) Three-way ANOVA	1.5 hrs.
(g) Covariance	3.5 hrs.

Program C - "Applications of Non-parametric Statistics to Vocational and Practical Arts Problems."

(a) One-sample cases	3.5 hrs.
(b) Two-sample cases for related and independent samples	3.5 hrs.
(c) Multi-sample cases for related and independent samples	3.5 hrs.
(d) Non-parametric measures of correlation	3.5 hrs.

Program D - "Developing Data Collection Instruments."

(a) Levels for measurement and scaling techniques	3.5 hrs.
(b) Factors influencing and types of validity and reliability	3.5 hrs.
(c) Procedures for measuring validity and reliability	7.0 hrs.

Staff: Dr. Neal E. Vivian of The Center staff will act as Project Director and Jerome Moss, Professor of Industrial Education, University of Minnesota will be the Instructional Coordinator.

The instructional team for each program will include a Statistical Specialist and a Vocational Consultant. The vocational consultant will insure that the utility of the statistical content for vocational and practical arts education problems is made clear.

The instructional teams for the four programs are:

Program A - James S. Terwiliger, University of Minnesota, (Statistical Specialist), and

David J. Pucel, University of Minnesota, (Vocational Consultant)

Program B - Gene V. Glass, University of Colorado, (Statistical Specialist), and

Douglas Sjogren, Colorado State University, (Vocational Consultant)

Program C - Leonard Marascuilo, University of California, Berkeley (Statistical Specialist), and

Everett Edington, Director, Research Coordinating Unit, Sacramento (Vocational Consultant)

Program D - J. Thomas Hastings, University of Illinois, (Statistical Specialist), and

Lloyd Phipps, University of Illinois, (Vocational Consultant)

Number and Selection of Participants

To promote effective classroom interaction and to insure the availability of appropriate size hotel meeting rooms each program will be limited to 30 participants.

In order to cover the proposed content adequately in the time available, and attain the objectives of the program, it is necessary to establish one graduate level course in statistics as the minimum eligibility criterion for participants in all programs.

Among those who meet this eligibility requirement, preference will be given to those who:

1. Have research responsibilities and/or opportunities.
2. Are employed in vocational and practical arts education positions.
3. Have conducted or are conducting research in vocational and practical arts education.
4. Have completed two to four graduate courses in statistics.

No tuition or registration fee will be charged.

No reimbursement for travel, per diem, or other expenses will be provided for the participants.

Those interested in attending should return a completed application form as soon as possible. The deadline for accepting applications is October 31, 1967. Additional application forms will be sent out upon request.

Acceptance notices will be sent out early in November. Address all communications to:

Neal E. Vivian, Director
A.V.A. Presession Research Training Program
The Center for Vocational and Technical Education
980 Kinnear Road
Columbus, Ohio 43212

Application Form

A.V.A. PRESESSION RESEARCH TRAINING PROGRAM
Cleveland, Ohio
December 2-3, 1967

General Information

Name ____
(last) (first) (middle)

Mailing Address ______________________________
____
____
Zip Code

Phone Number ______________________________
Area Code

Educational History

Baccalaureate ______________________________
Major area School Year

Masters ______________________________
Major area School Year

Doctorate ______________________________
Major area School Year

Other educational work ______________________________

Number of graduate courses completed in Statistics___. No. of (Qtr.) (Sem.) hrs._____.

Experience

Research Positions Held (last 5 years)

____

____

____

Vocational Education Positions Held (last 5 years)

____

____

____

Employment Responsibilities

Briefly describe the nature of your present position -

What current or recent research and/or program development efforts in vocational education have you been involved in?

The four training programs are described in the attached sheets. You will be eligible to attend only one. Indicate your preference below.

1st choice program _____ ( )

2nd choice program _____ ( )

3rd choice program _____ ( )

4th choice program _____ ( )

I agree that if accepted to participate in one of the above programs I will be in attendance for the entire two day period. Further, I understand that no reimbursement for travel, per diem or other expenses incurred as a result of my participation can be provided by this training project. (Instructional materials used during the two days will however be provided at no cost to the trainees.)

____
Signature

A block of rooms has been reserved at the Pick-Carter Hotel for the participants in the Presession Training Program. A description of hotel accommodations and a reservation form is enclosed for your convenience. Participants will be expected to make their own reservations. The following information will assist us in making arrangements.

Are you a member of the American Vocational Association (A.V.A.)?_____

Do you plan to attend the A.V.A. Convention after completion of the Presession? _____

Please complete and return by October 31, 1967 to:

Neal E. Vivian, Director
A.V.A. Presession Research Training Program
The Center for Vocational and Technical Education
980 Kinnear Road
Columbus, Ohio 43212

61st ANNUAL A.V.A. CONVENTION

Accommodations and Rates

	Single Person	Double 1 Bed, 2 Persons	Twin 2 Beds, 2 Persons
Sheraton Cleveland	$ 8.50-13.00	$ 15.50-17.50	$ 17.50-23.00
Statler Hilton	9.50-15.00	16.00-18.50	18.00-23.00
Hollenden House	14.00	22.00	22.00-23.00
The Pick-Carter	8.25-12.00	12.25-16.00	15.00-17.00
The Manger	8.00- 9.50	11.00-12.50	13.00-15.00
Auditorium Hotel	7.50-11.50	10.00-14.00	14.00-15.00
Colonial Motor		13.50	9.50-13.50
Sahara Motor			15.00-16.50
Howard Johnson's Lakefront	12.00		18.00-21.00
Lake Erie		15.00	15.00-16.00

MAIL TO: MARY O'DONNELL, AVA HOUSING BUREAU / C/O CLEVELAND CONVENTION
AND VISITORS BUREAU, 511 TERMINAL TOWER, CLEVELAND, OHIO 44113

Please Reserve Accommodations As Follows:

Name & City (Bracket those sharing rooms)	Type Accommodations	Rate	Arrival Date	Departure Date

Your Name____

Address____
Street City State Zip

Please make hotel reservations as follows: Hotel/Motel________1st choice,

______________________2nd choice,______________________3rd choice.

(If this form is not used, please MAKE CERTAIN all information on form is supplied.)

TO Directors of Research Coordinating Units

FROM Neal E. Vivian, Director
A.V.A. Presession Research Training Program

RE: Openings which still exist for additional applicants

DATE November 10, 1967

There are still a few openings in the following programs at the A.V.A. Presession Research Training Seminar:

Program A - Regression Models

Program B - Analysis of Variance

Program C - Non-parametric Statistics

Program D (Data Collection Instruments) is full and we cannot accommodate any additional participants.

After talking with other people on the committee it was suggested that this information be communicated to RCU directors. It was further suggested that they in turn might wish to call vocational educators within their state who might be prospective candidates for this Presession and urge them to apply.

We would sincerely appreciate your calling this to the attention of people within your state. An additional supply of information sheets and application blanks are enclosed for your convenience.

Thank you for your courtesy and cooperation.

NEV:zp

TO Supervisors of Industrial Arts

FROM Neal E. Vivian, Director
A.V.A. Presession Research Training Programs

DATE November 10, 1967

Enclosed is some information concerning the A.V.A. Presession Research Training Seminar. This should have been sent to you much earlier. Please accept my apology for the delay.

If you, or any of your colleagues, are interested in attending this program we urge you to apply as soon as possible.

Please disregard the deadline date as your application will be accepted and considered if we receive it in the very near future. We are looking forward to hearing from you.

NEV:zp

RE: Notice of Acceptance to the A.V.A. Research
Training Program

Dear

The selection committee is pleased to announce that you have been chosen to participate in the Presession Research Training Program on December 2 and 3 in Cleveland, Ohio.

You have been accepted for Program

The programs will begin at 8:30 a.m., Saturday, December 2 and close at 5:00 p.m., Sunday, December 3.

Below is a room schedule for Saturday only. There will be one change in room schedules for Sunday. An announcement will be made regarding this on Saturday.

Program A - (Regression Models) - El Rancho Room

Program B - (Analysis of Variance) - Spanish Room

Program C - (Non-Parametric Statistics) - Embassy Room

Program D - (Data Collection Instruments) - Automotive Room

Headquarters Room - South Georgian Room

Please report to the South Georgian Room by 8:15 a.m., Saturday so that you may register and be in your program room by 8:30.

Some instructors may be mailing materials to participants as preparation for their programs.

Thank you for your interest and willingness to participate in this research training effort. We are looking forward to seeing you in Cleveland. Meanwhile, if there is any further information which you need please do not hesitate to call or write.

Very truly yours,

Neal E. Vivian
Director
Research Training Seminars

NEV:zp

AVA PRE-SESSION RESEARCH TRAINING PROGRAM
The Pick-Carter Hotel
Cleveland, Ohio
December 2-3, 1967

Program Outline

Saturday, December 2 and
Sunday, December 3 — 8:30 a.m. to 5:00 p.m.

Headquarters Room - The South Georgian Room

Program A - El Rancho Room

"Applications of Regression Models to Prediction Problems in Vocational and Practical Arts Education."

Statistical Specialist - James S. Terwiliger
University of Minnesota

Vocational Consultant - David J. Pucel
University of Minnesota

Program B - Spanish Room

"Applications of Analysis of Variance Techniques to Evaluation Problems in Vocational and Practical Arts Education."

Statistical Specialist - Gene V. Glass
University of Colorado

Vocational Consultant - Douglas Sjogren
Colorado State University

Program C - Embassy Room

"Applications of Non-parametric Statistics to Vocational and Practical Arts Problems."

Statistical Specialist - Leonard Marascuilo
University of California

Vocational Consultant - Everett Edington, Director
Research Coordinating Unit
Sacramento, California

Program D - Automotive Room, Saturday - Aviation Room, Sunday

"Developing Data Collection Instruments."

Statistical Specialist -	J. Thomas Hastings University of Illinois
Vocational Consultant -	Lloyd Phipps University of Illinois

Administrative Personnel -

Dr. Neal E. Vivian, Director
AVA Pre-session Research Training Program

Dr. Jerome Moss, Co-Director
AVA Pre-session Research Training Program

Dr. Virgil E. Christensen, Consultant
AVA Pre-session Research Training Program

Mr. Kenneth E. Hoffman, Research Associate

NEV:zp

AVA PRESESSION RESEARCH TRAINING PROGRAM
December 2-3
Cleveland, Ohio

Please complete this form and return it to the Program Director, Neal E. Vivian before the end of the Seminar.

....

Please indicate by checking the blank, the program you participated in during the Research Training Program.

_____ Program A "Applications of Regression Models to Prediction Problems in Vocational and Practical Arts Education."

_____ Program B "Applications of Analysis of Variance Techniques to Evaluation Problems in Vocational and Practical Arts Education."

_____ Program C "Applications of Non-parametric Statistics to Vocational and Practical Arts Problems."

_____ Program D "Developing Data Collection Instruments."

I. Program Evaluation - CONGRUENCE BETWEEN PROGRAM AND STATED OBJECTIVES

The objectives for all four programs are stated below. After each objective please indicate how successful the program was in accomplishing the stated objectives.

1. Familiarity with statistical techniques, their basic logic, procedures, limitations and assumptions.

   _____ Maximally successful

   _____ Very successful

   _____ Moderately successful

   _____ Minimally successful

   _____ Completely unsuccessful

   Comments____

   ____

   ____

2. Recognition of the relevancy and design applications of those techniques to certain types of vocational and practical arts problems.

_____ Maximally successful

_____ Very successful

_____ Moderately successful

_____ Minimally successful

_____ Completely unsuccessful

Comments____

____

____

3. An awareness of the effects of data characteristics upon analysis techniques.

_____ Maximally successful

_____ Very successful

_____ Moderately successful

_____ Minimally successful

_____ Completely unsuccessful

Comments____

____

____

4. The skill to conceptualize the relationships among problem variables for statistical design purposes.

_____ Maximally successful

_____ Very successful

_____ Moderately successful

_____ Minimally successful

_____ Completely unsuccessful

Comments____

____

____

5. The ability to utilize effectively the consultive services of statistical experts.

_____ Maximally successful

_____ Very successful

_____ Moderately successful

_____ Minimally successful

_____ Completely unsuccessful

Comments______________________________________

____

____

6. ORGANIZATION OF THE PROGRAM.

_____ Excellent organization in meaningful sequence

_____ Well organized

_____ Adequate, but could be better

_____ Inadequate organization

_____ Confused and unsystematic

Comments______________________________________

____

____

7. PROGRAM LENGTH.

_____ Program length was just right

_____ Program was long, but acceptable

_____ Program was short, but acceptable

_____ Program was much too long

_____ Program was too short to cover the content

Comments____

____

____

8. DEGREE TO WHICH PROGRAM OUTCOMES MET MY PRIOR EXPECTATIONS.

_____ Program exceeded my prior expectations

_____ My prior expectations were well met

_____ Program was adequate in terms of prior expectations but could have been better

_____ Program was barely adequate in this respect

_____ Program completely failed to meet my expectations

Comments____

____

____

9. HOW REALISTIC AND ATTAINABLE WERE THE OBJECTIVES AND OUTCOMES OF THE SEMINAR?

_____ Very realistic and easily attainable

_____ Capable of being accomplished by most participants

_____ Adequate, or average

_____ Lacking in realism considering time involved and type of participants

_____ Completely unrealistic

Comments____

____

____

10. APPLICABILITY OF CONTENT TO NEEDS.

_____ Content was exceptionally well related to my needs

_____ Content was moderately well related to my needs

_____ Content was adequate - could be better

_____ Content was only slightly related to my needs

_____ Content was completely unrelated to my needs

Comments____

____

____

11. LEVEL OF CONTENT.

_____ Content level was just about right

_____ High, but acceptable

_____ Low, but acceptable

_____ Content was far above level needed for my work

_____ Level was entirely too low

Comments____

____

____

12. OPPORTUNITY FOR QUESTIONS AND DISCUSSION.

_____ Ample opportunity

_____ Moderate opportunity

_____ Occasional opportunity

_____ Rare opportunity

_____ Never

Comments____

____

____

13. GENERAL EVALUATION OF INSTRUCTION.

_____ Outstanding

_____ Good

_____ Satisfactory

_____ Inadequate

_____ Poor

Comments____

____

____

14. TEXTS OR OTHER PRINTED INSTRUCTIONAL MATERIALS.

_____ Texts and materials excellent

_____ Good

_____ Adequate, but could be better

_____ Text and materials need modification

_____ Text and materials entirely inappropriate

Comments____

____

____

15. CONTRIBUTION OF PROGRAM TO INCREASED JOB COMPETENCIES.

_____ Program will be of great value in increasing job competencies

_____ Program will be helpful

_____ Program will be of moderate value only

_____ Program will be of little value

_____ Program will be valueless

Comments____

____

____

16. MEETING ROOMS OR ACCOMMODATIONS.

_____ Excellent

_____ Good

_____ Barely adequate

_____ Poor

_____ Completely inadequate

Comments____

____

____

17. EVALUATION OF THE SPECIFIC MAJOR TOPICS.

Please indicate how valuable the treatment of each of the major topics in your program only was to you.

Program A - Regression Models	Maximum Value	High Value	Moderate Value	Limited Value	No Value
(a) Review of general bivariate regression	_____	_____	_____	_____	_____
(b) Multiple regression	_____	_____	_____	_____	_____
(c) Canonical correlation	_____	_____	_____	_____	_____
(d) Discriminant analysis	_____	_____	_____	_____	_____

Comments____

____

____

Program B - Analysis of Variance					
(a) Normal and F sampling distributions and tests of means and variances	_____	_____	_____	_____	_____
(b) One-way ANOVA	_____	_____	_____	_____	_____
(c) Two-way ANOVA	_____	_____	_____	_____	_____
(d) Contrasts (Orthogonal, Scheffé, etc.)	_____	_____	_____	_____	_____

	Maximum Value	High Value	Moderate Value	Limited Value	No Value
Program B - continued					
(e) Nested and cross design	___	___	___	___	___
(f) Three-way ANOVA	___	___	___	___	___
(g) Covariance	___	___	___	___	___

Comments____

____

____

Program C - Non-parametric Statistics

(a) One-sample cases	___	___	___	___	___
(b) Two-sample cases for related and independent samples	___	___	___	___	___
(c) Multi-sample cases for related and independent samples	___	___	___	___	___
(d) Non-parametric measures of correlation	___	___	___	___	___

Comments____

____

____

Program D - Data Collection Instruments

(a) Levels for measurement and scaling techniques	___	___	___	___	___
(b) Factors influencing and types of validity and reliability	___	___	___	___	___
(c) Procedures for measuring validity and reliability	___	___	___	___	___

Comments____

____

____

Please indicate in the space provided below two or three ways that you plan to apply the outcomes that you have obtained from attending this program.

____

____

____

____

____

____

Would you recommend that The Center continue to sponsor such Research Training Seminars? _____ Yes _____ No

Would you recommend that they be offered just prior to the A.V.A. Convention as they were this year? _____ Yes _____ No

What others times do you feel would be appropriate? ______________

____

Please indicate in the space provided below your suggestions for topics or problem areas for future Research Training Seminars. You may also indicate any other general suggestions for conducting future training programs.

____

____

____

____

____

____

____

____

____

NEV:zp

APPENDIX D

FORMATS FOR RESEARCH TRAINING PROGRAMS

Notes to Accompany
Presentation of a Special AVA Pre-Session on Correlation and Regression Methodologies

James S. Terwilliger
University of Minnesota

Pick-Carter Hotel

Cleveland, Ohio

December 2 and 3, 1967

General Outline of

Pre-Session on Correlation and Regression

Saturday, December 2

I. Introduction and Overview

II. Basic Concepts from Descriptive Statistics
  A. frequency distribution
  B. mean and standard deviation
  C. algebra of summation
  D. standard scores

III. Bivariate Linear Regression and Correlation
  A. Cartesian coordinates and straight lines
  B. method of "least squares"
  C. "regression toward the mean" and bivariate prediction
  D. accuracy in prediction
  E. assumptions for applications involving description
  F. assumptions for applications involving inference
  G. special cases
    1. one dichotomous variable
    2. two dichotomous variables

Sunday, December 3

IV. Part and Partial Correlation
  A. residual variates
    1. variances and covariances of residuals
    2. correlations of residuals
  B. problems in interpretation
  C. tests of significance

V. Multiple Linear Regression and Correlation
  A. two-predictor case
    1. three-dimensional plots
    2. partial regression coefficients
    3. accuracy of prediction
  B. general case
  C. tests of significance
  D. practical criteria of significance
  E. cross-validation
  F. special applications

VI. Group Discrimination Techniques
  A. two-group case
  B. general case
  C. predicting group membership

VII. Canonical Correlation
   A. weighting criteria and predictors to maximize correlations of composites
   B. canonical variates and canonical weights
   C. statistical vs. rational weighting

AVA PRE-SESSION

Program D

Developing Data Collection Instruments
Phipps and Hastings
University of Illinois

Saturday, 2 December 1967

8:30-12:00

A description of purpose and activities for the Pre-Session (Hastings)

A broad view of data collection techniques (Hastings)

Tests, questionnaires, interviews, observations in naturalistic settings, quasi-naturalistic tasks--necessity for multi-technique

Examples of instruments: General (Hastings); VOTEC (Phipps) (With explanations of "why")

1:30-3:00

Continuation of "examples" (Phipps and Hastings)

3:00-5:00

Break into small groups ($N = 8 \pm 1$). Each group will work on defining some particular area of data collection; develop some few examples of instrumentation; prepare, where possible, the transparencies representing the techniques . . . . not a finished product. (Phipps and Hastings will circulate among the groups for consultation purposes.)

Sunday, 3 December 1967

9:00-10:00

Some general considerations for objectivity, replicability, reliability, and validity--with discussion by group (Hastings and Phipps)

10:00-12:00

Presentation of material from small groups with questions, comments, and criticism by entire group--with special reference to prior session

1:30-3:30

Continuation of group reports and comments

3:30-5:30

Presentation of a number of real, local problems with data collection with discussion by Phipps and Hastings

Summary statement of areas covered (Phipps and Hastings)

APPENDIX E

SUMMARIES OF PARTICIPANT'S EVALUATION

AVA PRESESSION RESEARCH TRAINING PROGRAM
December 2-3
Cleveland, Ohio

PARTICIPANT'S EVALUATION

Please complete this form and return it to the Program Director, Neal E. Vivian before the end of the Seminar.

……

Please indicate by checking the blank, the program you participated in during the Research Training Program.

X Program A "Applications of Regression Models to Prediction Problems in Vocational and Practical Arts Education."

____ Program B "Applications of Analysis of Variance Techniques to Evaluation Problems in Vocational and Practical Arts Education."

____ Program C "Applications of Non-parametric Statistics to Vocational and Practical Arts Problems."

____ Program D "Developing Data Collection Instruments."

I. Program Evaluation - CONGRUENCE BETWEEN PROGRAM AND STATED OBJECTIVES

The objectives for all four programs are stated below. After each objective please indicate how successful the program was in accomplishing the stated objectives.

1. Familiarity with statistical techniques, their basic logic, procedures, limitations and assumptions.

4 Maximally successful

9 Very successful

1 Moderately successful

____ Minimally successful

____ Completely unsuccessful

2. Recognition of the relevancy and design applications of those techniques to certain types of vocational and practical arts problems.

2 Maximally successful

7 Very successful

4 Moderately successful

____ Minimally successful

1 Completely unsuccessful

3. An awareness of the effects of data characteristics upon analysis techniques.

3 Maximally successful

5 Very successful

5 Moderately successful

1 Minimally successful

____ Completely unsuccessful

4. The skill to conceptualize the relationships among problem variables for statistical design purposes.

3 Maximally successful

6 Very successful

4 Moderately successful

1 Minimally successful

____ Completely unsuccessful

5. The ability to utilize effectively the consultive services of statistical experts.

4 Maximally successful

5 Very successful

1 Moderately successful

3 Minimally successful

_____ Completely unsuccessful

6. ORGANIZATION OF THE PROGRAM.

10 Excellent organization in meaningful sequence

3 Well organized

1 Adequate, but could be better

_____ Inadequate organization

_____ Confused and unsystematic

7. PROGRAM LENGTH.

6 Program length was just right

4 Program was long, but acceptable

2 Program was short, but acceptable

_____ Program was much too long

2 Program was too short to cover the content

8. DEGREE TO WHICH PROGRAM OUTCOMES MET MY PRIOR EXPECTATIONS.

____ Program exceeded my prior expectations

9 My prior expectations were well met

4 Program was adequate in terms of prior expectations but could have been better

1 Program was barely adequate in this respect

____ Program completely failed to meet my expectations

9. HOW REALISTIC AND ATTAINABLE WERE THE OBJECTIVES AND OUTCOMES OF THE SEMINAR?

1 Very realistic and easily attainable

9 Capable of being accomplished by most participants

2 Adequate, or average

2 Lacking in realism considering time involved and type of participants

____ Completely unrealistic

10. APPLICABILITY OF CONTENT TO NEEDS.

4 Content was exceptionally well related to my needs

5 Content was moderately well related to my needs

3 Content was adequate - could be better

2 Content was only slightly related to my needs

____ Content was completely unrelated to my needs

11. LEVEL OF CONTENT.

5 Content level was just about right

7 High, but acceptable

1 Low, but acceptable

1 Content was far above level needed for my work

_____ Level was entirely too low

12. OPPORTUNITY FOR QUESTIONS AND DISCUSSION.

11 Ample opportunity

2 Moderate opportunity

1 Occasional opportunity

_____ Rare opportunity

_____ Never

13. GENERAL EVALUATION OF INSTRUCTION.

8 Outstanding

6 Good

_____ Satisfactory

_____ Inadequate

_____ Poor

14. TEXTS OR OTHER PRINTED INSTRUCTIONAL MATERIALS.

4 Texts and materials excellent

8 Good

2 Adequate, but could be better

____ Text and materials need modification

____ Text and materials entirely inappropriate

15. CONTRIBUTION OF PROGRAM TO INCREASED JOB COMPETENCIES.

3 Program will be of great value in increasing job competencies

10 Program will be helpful

1 Program will be of moderate value only

____ Program will be of little value

____ Program will be valueless

16. MEETING ROOMS OR ACCOMMODATIONS.

1 Excellent

10 Good

3 Barely adequate

____ Poor

____ Completely inadequate

17. EVALUATION OF THE SPECIFIC MAJOR TOPICS.

Please indicate how valuable the treatment of each of the major topics in your program was to you.

Program A - Regression Models	Maximum Value	High Value	Moderate Value	Limited Value	No Value
(a) Review of general bivariate regression	4	2	4	3	
(b) Multiple regression	4	3	5	1	
(c) Canonical correlation	3	1	5	4	
(d) Discriminant analysis	5	3	4	1	

AVA PRESESSION RESEARCH TRAINING PROGRAM
December 2-3
Cleveland, Ohio

PARTICIPANT'S EVALUATION

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____ Program C "Applications of Non-parametric Statistics to Vocational and Practical Arts Problems."

____ Program D "Developing Data Collection Instruments."

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1. Familiarity with statistical techniques, their basic logic, procedures, limitations and assumptions.

_2_ Maximally successful

_9_ Very Successful

_5_ Moderately successful

____ Minimally successful

____ Completely unsuccessful

2. Recognition of the relevancy and design applications of those techniques to certain types of vocational and practical arts problems.

1 Maximally successful

4 Very successful

6 Moderately successful

5 Minimally successful

____ Completely unsuccessful

3. An awareness of the effects of data characteristics upon analysis techniques.

5 Maximally successful

8 Very successful

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4. The skill to conceptualize the relationships among problem variables for statistical design purposes.

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4 Very successful

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2 Minimally successful

____ Completely unsuccessful

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5 Maximally successful

4 Very successful

6 Moderately successful

1 Minimally successful

____ Completely unsuccessful

6. ORGANIZATION OF THE PROGRAM.

6 Excellent organization in meaningful sequence

9 Well organized

1 Adequate, but could be better

____ Inadequate organization

____ Confused and unsystematic

7. PROGRAM LENGTH.

4 Program length was just right

3 Program was long, but acceptable

4 Program was short, but acceptable

(next page)

____ Program was much too long

_5_ Program was too short to cover the content

8. DEGREE TO WHICH PROGRAM OUTCOMES MET MY PRIOR EXPECTATIONS.

_4_ Program exceeded my prior expectations

_9_ My prior expectations were well met

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____ Program completely failed to meet my expectations

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_2_ Very realistic and easily attainable

_10_ Capable of being accomplished by most participants

_3_ Adequate, or average

_1_ Lacking in realism considering time involved and type of participants

____ Completely unrealistic

10. APPLICABILITY OF CONTENT TO NEEDS.

5 Content was exceptionally well related to my needs

5 Content was moderately well related to my needs

4 Content was adequate - could be better

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____ Content was completely unrelated to my needs

11. LEVEL OF CONTENT.

5 Content level was just about right

10 High, but acceptable

____ Low, but acceptable

1 Content was far above level needed for my work

____ Level was entirely too low

12. OPPORTUNITY FOR QUESTIONS AND DISCUSSION.

12 Ample opportunity

2 Moderate opportunity

2 Occasional opportunity

____ Rare opportunity

____ Never

13. GENERAL EVALUATION OF INSTRUCTION.

11 Outstanding

5 Good

____ Satisfactory

____ Inadequate

____ Poor

14. TEXTS OR OTHER PRINTED INSTRUCTIONAL MATERIALS.

13 Texts and materials excellent

2 Good

1 Adequate, but could be better

____ Text and materials need modification

____ Text and materials entirely inappropriate

15. CONTRIBUTION OF PROGRAM TO INCREASED JOB COMPETENCIES.

6 Program will be of great value in increasing job competencies

8 Program will be helpful

1 Program will be of moderate value only

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____ Completely inadequate

17. EVALUATION OF THE SPECIFIC MAJOR TOPICS.

Please indicate how valuable the treatment of each of the major topics in your program was to you.

Program B - Analysis of Variance	Maximum Value	High Value	Moderate Value	Limited Value	No Value
(a) Normal and F sampling distributions and tests of means and variances	4	6	4	1	
(b) One-way ANOVA	6	5	2	1	
(c) Two-way ANOVA		3	1	3	
(d) Contrasts (Orthogonal, Scheffé, etc.)		1	1	4	1
(e) Nested and cross design		1	2	1	1
(f) Three-way ANOVA		1	1	1	2
(g) Covariance	1	2	4		1

AVA PRESESSION RESEARCH TRAINING PROGRAM
December 2-3
Cleveland, Ohio

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4 Very successful

8 Moderately successful

2 Minimally successful

____ Completely unsuccessful

3. An awareness of the effects of data characteristics upon analysis techniques.

5 Maximally successful

10 Very successful

2 Moderately successful

____ Minimally successful

____ Completely unsuccessful

4. The skill to conceptualize the relationships among problem variables for statistical design purposes.

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6 Very successful

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2 Occasional opportunity
____ Rare opportunity
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16. MEETING ROOMS OR ACCOMMODATIONS.

2 Excellent

11 Good

4 Barely adequate

____ Poor

____ Completely inadequate

17. EVALUATION OF THE SPECIFIC MAJOR TOPICS.

Please indicate how valuable the treatment of each of the major topics in your program was to you.

Program C - Non-parametric Statistics	Maximum Value	High Value	Moderate Value	Limited Value	No Value
(a) One-sample cases	8	6	3		
(b) Two-sample cases for related and independent samples	9	6	1	1	
(c) Multi-sample cases for related and independent samples	7	5	2	2	
(d) Non-parametric measures of correlation	8	5	2	1	

AVA PRESESSION RESEARCH TRAINING PROGRAM
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I. Program Evaluation - CONGRUENCE BETWEEN PROGRAM AND STATED OBJECTIVES

The objectives for all four programs are stated below. After each objective please indicate how successful the program was in accomplishing the stated objectives.

1. Familiarity with statistical techniques, their basic logic, procedures, limitations and assumptions.

_2_ Maximally successful

_6_ Very successful

_9_ Moderately successful

_4_ Minimally successful

_3_ Completely unsuccessful

2. Recognition of the relevancy and design applications of those techniques to certain types of vocational and practical arts problems.

3 Maximally successful

8 Very successful

6 Moderately successful

6 Minimally successful

1 Completely unsuccessful

3. An awareness of the effects of data characteristics upon analysis techniques.

____ Maximally successful

9 Very successful

12 Moderately successful

2 Minimally successful

1 Completely unsuccessful

4. The skill to conceptualize the relationships among problem variables for statistical design purposes.

____ Maximally successful

7 Very successful

10 Moderately successful

2 Minimally successful

3 Completely unsuccessful

5. The ability to utilize effectively the consultive services of statistical experts.

4 Maximally successful

6 Very successful

5 Moderately successful

6 Minimally successful

3 Completely unsuccessful

6. ORGANIZATION OF THE PROGRAM.

4 Excellent organization in meaningful sequence

13 Well organized

8 Adequate, but could be better

1 Inadequate organization

____ Confused and unsystematic

7. PROGRAM LENGTH.

4 Program length was just right

3 Program was long, but acceptable

15 Program was short, but acceptable

(next page)

_2_ Program was acceptable

____ Program was much too long

_2_ Program was too short to cover the content

8. DEGREE TO WHICH PROGRAM OUTCOMES MET MY PRIOR EXPECTATIONS.

_2_ Program exceeded my prior expectations

_10_ My prior expectations were well met

_10_ Program was adequate in terms of prior expectations but could have been better

_5_ Program was barely adequate in this respect

____ Program completely failed to meet my expectations

9. HOW REALISTIC AND ATTAINABLE WERE THE OBJECTIVES AND OUTCOMES OF THE SEMINAR?

_4_ Very realistic and easily attainable

_11_ Capable of being accomplished by most participants

_6_ Adequate, or average

_5_ Lacking in realism considering time involved and type of participants

____ Completely unrealistic

10. APPLICABILITY OF CONTENT TO NEEDS.

7 Content was exceptionally well related to my needs

13 Content was moderately well related to my needs

5 Content was adequate - could be better

2 Content was only slightly related to my needs

_____ Content was completely unrelated to my needs

11. LEVEL OF CONTENT.

14 Content level was just about right

2 High, but acceptable

9 Low, but acceptable

_____ Content was far above level needed for my work

2 Level was entirely too low

12. OPPORTUNITY FOR QUESTIONS AND DISCUSSION.

21 Ample opportunity

5 Moderate opportunity

1 Occasional opportunity

_____ Rare opportunity

_____ Never

13. GENERAL EVALUATION OF INSTRUCTION.

10 Outstanding

13 Good

3 Satisfactory

1 Inadequate

____ Poor

14. TEXTS OR OTHER PRINTED INSTRUCTIONAL MATERIALS.

13 Texts and materials excellent

7 Good

7 Adequate, but could be better

____ Text and materials need modification

____ Text and materials entirely inappropriate

15. CONTRIBUTION OF PROGRAM TO INCREASED JOB COMPETENCIES.

6 Program will be of great value in increasing job competencies

14 Program will be helpful

6 Program will be of moderate value only

1 Program will be of little value

____ Program will be valueless

16. MEETING ROOMS OR ACCOMMODATIONS.

7 Excellent

14 Good

2 Barely adequate

2 Poor

____ Completely inadequate

17. EVALUATION OF THE SPECIFIC MAJOR TOPICS

Please indicate how valuable the treatment of each of the major topics in your program was to you.

Program D - Data Collection Instruments	Maximum Value	High Value	Moderate Value	Limited Value	No Value
(a) Levels for measurement and scaling techniques	3	7	9	2	1
(b) Factors influencing and types of validity and reliability	3	16	7	1	
(c) Procedures for measuring validity and reliability	3	12	8	3	1

APPENDIX F

PARTICIPANT'S PLANS FOR APPLICATION OF SEMINAR OUTCOMES

Please indicate in the space provided below two or three ways that you plan to apply the outcomes that you have obtained from attending this program.

Ideas to be used in development of plans for course.
Serve as a refresher. The updated information very helpful
Will brief Research Assistants. Can use in research projects underway.
To develop more effective survey and follow-up instruments.
Pilot and curriculum survey.
Determining job opportunities.
Working with Graduate Students.
Bibliography and list of terms should prove helpful.
Curriculum revision.
Data analysis.
Personal growth.
Help with dissertation.
Research design.
In developing new research projects.
In aiding graduate students design research problems.
Advising graduate student dissertation research.
Presenting a paper at the National Council on Measurement in Education meeting in February.
I hope to have a study made in which prediction can be made relative to student amenability towards vocational education curriculums in the 10th grade. Too many of our youngsters, who are average students, are in the college prep class--and at present no convincer exists as to the advisability of changing to vocational education curriculums.
Use of artificial dichotomy applications, and especially use of Phi coefficient for graduate student's studies of contingency cases.
Group discrimination, into vocational versus academic, and between vocational areas.
Suggestive of some discriminatory analysis problems.
Trade proficiency exams. Seminar.
The discriminant analysis technique has immediate application to a research project on which I am now working. The other techniques may prove useful as I work with other members of the Vocational Education Department on their respective research.
Motivation to keep up on my reading.
In lending technical assistance to instructional services, student services and research and development supervisors in AVA Vocational-Technical and Adult Schools. Also in designing studies developed out of our office.
In setting research designs to increase validity. To understand research results. To evaluate experimental results.
New methods, new techniques, and new insights will be incorporated into my proposal and data gathering instrument.
I shall return to spare time reading of the best statistical books I can find.

This can be applied to my class in a course in "Research and Design."
Primarily in evaluating research reports.
Directing master's and doctor's studies. Personal research.
Funded research.
Primarily in teaching.
Plan to reorganize research methods. Plan to increase research program. Plan to further study in research methods and procedures.
My intentions are to apply knowledge gained from this program to evaluate and analyse the outcome of an Active and Control group used for acquiring Industrial Arts teacher.
Research projects. Training project evaluation. Advising graduate students.
Redesign impending research project dealing with curriculum changes.
Directing and conducting research.
Read text material recommended. Audit non-parametric classes.
Personal research. Technical assistance to others in the state.
Have some data and hope to evaluate it better than could have done without this course. Hope to design future studies using these tests. Hope to assist others in conducting research.
I think I've found the answer to a problem that has worried me for six years (Analysis of Data). Disseminate information to appropriate persons who need updated techniques.
I intend to audit a course in statistics since these two days have pointed up my lag in statistics. I intend to purchase the suggested books so that I can have these for ready reference.
Exposure was excellent, and will be of increased value as understanding of background information increases.
Will provide a better base upon which to discuss statistical inferences with staff statisticians.